

The present invention provides a method of efficient pixel placement for producing dense pixel visualizations that are capable of showing large volumes of data sets and provides a heuristic placement method to resolve locality and ordering constraints. The present invention allows for the partition of the data set according to the x-axis and y-axis and for placement of pixels of each partition in the corresponding regions according to the x-and y- ordering. As such, the present invention provides a method for generating a pixel bar chart for detecting close relationships and trends among the data that is categorized and easy to understand.

Figure 2 is a flowchart diagram illustrating steps in a process 200 for placement of data for visualization of multidimensional data sets using multiple pixel bar charts in accordance with an embodiment of the present invention. Steps of process 200, in the present embodiment, may be implemented with any computer languages used by those of ordinary skill in the art. In one embodiment, process 200 is for graphically presenting and visually mining large volumes of data using a graphically displayable array.

At step 210 of process 200, the plurality of records are sorted by the first dividing attribute. In one embodiment, the first dividing attribute is selected for partitioning the plurality of records (e.g., the data) into groups. In one embodiment, the groups correspond to a partitioning of the screen of a display according to the horizontal axis (e.g., x-axis).

At step 220, the records are partitioned into groups according to the first dividing attribute. In one embodiment, the first dividing attribute corresponds to the vertical axis (D_x).

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Figure 3a is a block diagram of a graphically displayable array 300 (e.g., a pixel bar chart) as shown on a display illustrating the partitioning of records into groups 306 accordingly in accordance with an embodiment of the present invention.

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Graphically displayable array 300 has horizontal axis (e.g., x-axis) 302 and vertical axis (e.g., y-axis) 304 and comprises a plurality of data points (e.g., pixels). The records are sorted by the first dividing attribute, which corresponds to horizontal axis 302. The records are divided into groups 306 according to each record's value of the first dividing attribute.

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At step 230, the records are partitioned into sub-groups according to the second dividing attribute. In one embodiment, the second dividing attribute corresponds to the vertical axis (D_y). It should be appreciated that in an embodiment of the present invention, no attribute is specified for the second dividing attribute.

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Figure 3b is a block diagram of a graphically displayable array 320 (e.g., a pixel bar chart) as shown on a display illustrating the partitioning of records within a group

306 into sub-groups 308 accordingly in accordance with an embodiment of the present invention.

Graphically displayable array 320 has horizontal axis (e.g., x-axis) 302 and
5 vertical axis (e.g., y-axis) 304 and comprises a plurality of data points (e.g., pixels).
The records are divided into groups 306 according to each record's value of the first
dividing attribute. Within each group 306, the records are divided into sub-groups 308
according to each record's value of the second dividing attribute.

10 At step 240, the records of each sub-groups (or group if no second dividing
attribute is selected) are arranged and placed according to the first ordering attribute
and the second ordering attribute. In one embodiment, the arrangement and placement
of pixels is conducted according to a process for pixel placement within a sub-group
of a pixel bar chart as described in process 400 of Figure 4. In one embodiment, the
15 first ordering attribute corresponds to the horizontal axis (O_x) and the second ordering
attribute corresponds to the vertical axis (O_y).

Figure 3c is a block diagram of graphically displayable array 340 (e.g., a pixel
bar chart) as shown on a display illustrating the arranging of a plurality of records
20 within a sub-group 308 by a first ordering attribute and a second ordering attribute in
accordance with an embodiment of the present invention.